Ann. Bot. Fennici 45: 97–104 ISSN 0003-3847 (print) ISSN 1797-2442 (online)
Helsinki 30 April 2008 © Finnish Zoological and Botanical Publishing Board 2008

Taxonomic revision of *Dienia* (Malaxidinae, Orchidaceae)

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Received 21 Feb. 2006, revised version received 19 Jan. 2007, accepted 21 Mar. 2007

Margońska, H. B. & Kowalkowska, A. 2008: Taxonomic revision of *Dienia* (Malaxidinae, Orchidaceae). — *Ann. Bot. Fennici* 45: 97–104.

A taxonomic revision of the genus *Dienia* (Malaxidinae, Orchidaceae) is completed. Determination keys for closely similar Asian Malaxidinae genera and *Dienia* species, as well as descriptions and illustrations of the two accepted species are provided.

Key words: *Anaphora, Dienia*, *Gastroglottis, Liparis, Malaxis,* Malaxidinae, *Microstylis,* Orchidaceae, taxonomy

Dienia was established by Lindley (1824) on the basis of *D. congesta*, the specimens having been collected by Wallich (Wall. Cat. No. 1936) in Nepal. Lindley characterized the genus as terrestrial plants with a few plicate leaves, gynostemium short and straight, lip erect and parallel to the gynostemium, 3-lobed, distinctly hood-concaved, without large auricles of lateral lobes, etc. Later, Lindley (1830) listed seven species within the genus: *D. congesta*, *D. fusca* (both are synonyms of *D. ophrydis*), *D. gmelini* (*Microstylis monophyllos*; *see* Szlachetko & Margońska 2006), *D. cylindrostachya*, *D. muscifera* (*Microstylis cylindrostachya* and *M. muscifera*; *see* Szlachetko & Margońska 2006), *D. calycina* and *D. myurus* (respectively *Malaxis carnosa* and *M. myurus*).

The American plants in fact possess a deeply hood-concaved lip, but quite different habits and generative structures. Today, all those species are widely and correctly considered as representatives of *Malaxis*.

After a long nomenclatural oblivion, Szlachetko (1995) redefined and reintroduced the genus *Dienia*, but unfortunately with the incorrect, younger name *Gastroglottis*. *Dienia* was again re-established by Clemens and Jones (1996), now with six species: *D. benguetensis*, *D. curranii*, *D. latifolia*, *D. montana*, *D. truncicola* and *D. volkensii*.

A generic status of *Dienia* is beyond any doubt. The specimens are characterized by the similar habit: creeping rhizome, shoots in cluster; distinct erect, nodded, somewhat fleshy and fusiform or elongate pseudobulbs, usually completely covered by leaf bases and basal scales; leaves plicate when young, flat when mature, usually gathered at apical half of the pseudobulbs. A further very important criterion for *Dienia* is the characteristic arrangement of tepals and morphology of the lip. Based on the habit and particularly on the generative structures (Szlachetko & Margońska 2002), these species seem to be most similar to those of *Crepidium* and *Seidenfia*.

However, we have noted (Szlachetko *et al.* 1999) that Clemens and Jones (1996) made some taxonomical mistakes. They wrongly placed in *Dienia* the species *Malaxis benguetensis*, (*Crepidium carinatum*; *see* Margońska 2006) and

Microstylis truncicola (*Crepidium truncicola*, *see* Szlachetko 1995). On the other hand, Clemens and Jones (1996) wrongly placed *Malaxis ophrydis* in the genus *Crepidium*.

Seidenfaden (1997), after a careful study of type-species, protologues, and with the assistance of P. Ormerod and L. Garay, reached the conclusion that *Malaxis latifolia* and the older *Epidendrum ophrydis* are identical plants. Therefore, the combination *Dienia ophrydis* was proposed (Greuter *et al*. 2000: Art. 11.4.). Clemens and Jones (1996) also recognized in *Dienia* the following taxa: *D. curranii, D. latifolia, D. montana* and *D. volkensii*, which, however, should be treated as taxonomic synonyms of *D. ophrydis*.

Crepidium flavescens, described by Blume (1825), is sometimes treated as a synonym of *Malaxis latifolia* (*Dienia ophrydis*), but Clemens and Jones (1996) retained it in *Crepidium*. It has the following features characteristic of *Crepidium*: lip lateral lobes with entire distal margins; auricles well developed, elongated; central cavity of lip relatively small and surrounded by a prominent ring-like callus, cavity with a distinct, convexed roof above; and ovary and pedicel with smooth surfaces and ribs.

The taxonomic material (herbarium specimens, spirit collections, literature data and iconographies) kept in e.g.: AMES, B, BM, BO, C, C-GS, FI, G, K, K-L, L, LINN, P, SING, US, W and WU was used for this revision.

Key to *Dienia* and closely similar Asian genera of Malaxidinae

1. Plants saprophytic or semisaprophytic ..... *Risleya*
1. Plants autotrophic 2
2. Gynostemium column massive, at most slightly longer than staminodes; anther relatively small, distinctly broader than longer, its locules opening apically or ventrally ..... *Malaxis*
2. Gynostemium column slender, at least twice as long as staminodes; anther large, at most slightly broader than longer, its locules opening always ventrally 3
3. Lip simple, its lateral lobes not auricled 4
3. Lip 3-lobed, its lateral lobes auricled 5
4. Tepals widely spread; lip lingulate or ovate, lamina only with shallow depression above base, its apical margins entire, staminodia truncate to bifid at apices ..... *Glossochilopsis*
4. Tepals characteristically curving inwards; lip spatulate to flabellate, lamina with a distinct central cavity and apical margins usually dentate, staminodia with obtuse to subacute apices ..... *Seidenfia*
5. Apical margins of lip entire, lip flat, without basal cavity, ornamented at central portion only by parallel lamellae or binate set of calli at most obscurely convex; gynostemium elongate, sometimes with appendages along dorsal part of column; staminodes large, ribbon-, horn-, or wing-like, folding back from anther .... *Pseudoliparis*
5. Apical margins of lip usually entire, lobate to dentate, lip with a distinct central cavity; gynostemium relatively short, flat along the dorsal part; staminodes at most same length as anther, finger-like, erect 6
6. Flowers with tepals usually widely spread; distal margins of lip lateral lobes entire, lobate or dentate, central cavity of lip relatively small, surrounded by a prominent ring-like callus, cavity usually with a roof above ..... *Crepidium*
6. Flowers with tepals slightly spreading to curving inwards; distal margins of each lip's lateral lobes with 1 small, oblong, entire sublobe, central cavity large, embracing whole of lip lamina, surrounded only by convexity of two external nerves, without a distinct roof above ..... *Dienia*

Dienia Lindl.

Bot. Reg. 10: t. 825. 1824. — Generitype: *D. congesta* Lindl. (*D. ophrydis* König).

Gastroglottis Bl., Bijdr.: 397. 1825, *emend*. Szlach., Fragm. Florist. Geobot., Suppl. 3: 123. 1995. — Generitype: *G. montana* Bl. (*Dienia ophrydis*).

Anaphora Gagnep., Bull. Mus. Natl. Hist. Nat., II, 4: 592. 1932 (monotypic). — Generitype: *A. liparioides* Gagnep. (*Dienia ophrydis*).

The plants of the genus are medium-sized to relatively large within the subtribe, uniform in habit, commonly gathered in cluster (sometimes dense), with young shoots arising from a node near the base of previous pseudobulbs or from the top of arising rhizome. The roots are filiform, appearing from the base of the pseudobulbs and from the nodes of the rhizome. The rhizomes are creeping, sometimes branched, stem-like, with nodes few mm long, covered by tubular scales (elongated, inflated, acuminate to acute at apex). The pseudobulbs are erect, nodded; can be somewhat fleshy, fusiform to oblong, or slender and elongated, always green, completely covered by leaf bases and few basal tubular scales. The leaf petioles are well developed, amplexicaul and canaliculate, whereas the leaf sheaths are tubular; both are uniformly green or sometimes tinged with red, purple or violet. The leaves are 3–6, spirally arranged along the pseudobulbs, unequal

in size (the younger ones being the smallest), oblong, oblong-ovate to ovate, convolute, plicate when young, flat when mature, acute to acuminate at apex, basally cuneate to cordate, 3–7-nerved, green or with red, purple or violet tint, paler beneath. The inflorescence is terminal, becomes elongate with age, distinctly ribbed on surface, simple green or red, purple or violet; racemose (usually 20–60(80)-flowered), dense to very dense (nearly cylindrical); the peduncle is always somewhat longer than the raceme. The sterile bract is single, oblong-triangular to lanceolate, acute to acuminate, 1-nerved, reflexed. The floral bracts are oblong to lanceolate, acute to acuminate, 1-nerved, recurved. The ovary with pedicel are sinuate, with characteristically distinctly wavy ribs and rippling, nearly crenulate surfaces, pale green or red-, purple- or violet-coloured. The buds are pale-coloured. The non-resupinate flowers are small, often facing down, with tepals slightly spreading to curved inwards. The dorsal sepal is oblong to ovate, obtuse to subacute at apex, gently cordate at base, 3-nerved. The lateral sepals are slightly oblique, oblong to ovate, obtuse to subacute at apices, cordate at base, 3-nerved. The petals are oblanceolate to oblong-oblanceolate, obtuse to acute at apices, cuneate at base, 1-nerved. The lip is very characteristic, always 3-lobed, widest at about or just below lip base; the central cavity of lip is large, embracing whole of lip lamina, surrounded only by convexity of two external nerves, always without a distinct roof above, the external part of cavity is shallower, at each side semiovate to lunate in outline, whereas the inner part is distinctly deep and limbated by two of third inner cavity nerves; the mid-lobe is entire to 2-lobate, never dentate, the lateral lobes are semiovate to lunate, with distal margins only with a small entire sublobe at each distal margins (never dentate), the basal auricles are more or less abbreviated, obtuse to round; the basal callus is distinct and erect, in form of a transversal fold, truncate to rounded at top, with very widely spreading transversal lateral arms. The gynostemium is rather elongate and somewhat massive, dorsiventrally flattened, erect to gently arcuate with age; the column is distinctly longer than the staminodes, slender; the staminodes are well developed, erect, falcate, finger-like, and obtuse at apex. The anther is relatively large, ovate to nearly cordate, erect and movable, with 2 locules, which open ventrally. The connective is narrow and thin. The pollinia number 4, are nearly equal in size, oblong-ovate. Caudiculae are absent. The stigma is about transversely elliptic, relatively small, positioned in pocket and covered by a thin fold. The rostellum is triangular, truncate at apex. The viscidium is small. (Fig. 1).

The genus has only two species. *Dienia ophrydis* is widespread from India, China, Japan, Indochina, Malaysia, Philippines, Indonesia, and Australia to SW Pacific Islands. *Dienia seidenfadeniana* is known from Indonesia (Sumatra and West New Guinea).

Key to the species of *Dienia*

1. Plants with young shoots appearing from top of ascending rhizome; pseudobulbs slender and elongate; lip mid-lobe large, ovate, 2-lobed at top; lateral lobes with auricles reaching distinctly below lip base, obtuse at apices ..... *D. seidenfadeniana*
1. Plants with young shoots arising from node near base of previous pseudobulbs; pseudobulbs elongate, fusiform to oblong, lip mid-lobe entire, relatively small, oblong; lateral lobes with auricles distinctly abbreviated, rounded . ..... *D. ophrydis*

Dienia ophrydis (König) Seidenf. & Ormerod (Fig. 2)

Contr. Orchid Fl. Thailand 13: 18. 1997.

Epidendrum ophrydis König *in* A.J. Retzius, Observ. Bot. 6: 46. 1791. — *Malaxis ophrydis* (König) Ormerod *in* G. Seidenfaden, Descr. Epidendrorum J.G. König: 18. 1995. — *Crepidium ophrydis* (König) M.A. Clem. & D.L. Jones, Lasianthera 1: 38. 1996. — TYPE: Thailand. (Phuket area?), *König s.n.* (lectotype K!)

Malaxis latifolia J.E. Sm. *in* A. Rees, Cyclop. 22: 3. 1812, *non M. latifolia* Bl., Bijdr.: 397. 1825. (*Liparis latifolia* (Bl.) Lindl.). — *Microstylis latifolia* (J.E. Sm.) J.J. Sm., Fl. Buitenz. 6: 248. 1905., Orch. Java: 248. 1905. — *Gastroglottis latifolia* (J.E. Sm.) Szlach., Fragm. Flor. Geobot., Suppl. 3: 123. 1995. — *Dienia latifolia* (J.E. Sm.) M.A. Clem. & D.L. Jones, Lasianthera 1: 41. 1996. — TYPE: Nepal. (Upper), 1806 *Buchanan s.n.* in Herb. J.E. Smith *1396.3* (holotype LINN!).

Dienia congesta Lindl., Bot. Reg. 10: t. 825. 1824. — *Microstylis congesta* (Lindl.) Rchb.f. *in* W.G. Walpers, Ann. Bot. Syst. 6: 206. 1861. — *Malaxis congesta* (Lindl.) Deb, Bull. Bot. Surv. India 3: 128. 1962. — TYPE: Nepal. Narainhetty, 1821 *Wallich 1936* (holotype K-L!, isotypes G! on two sheets).

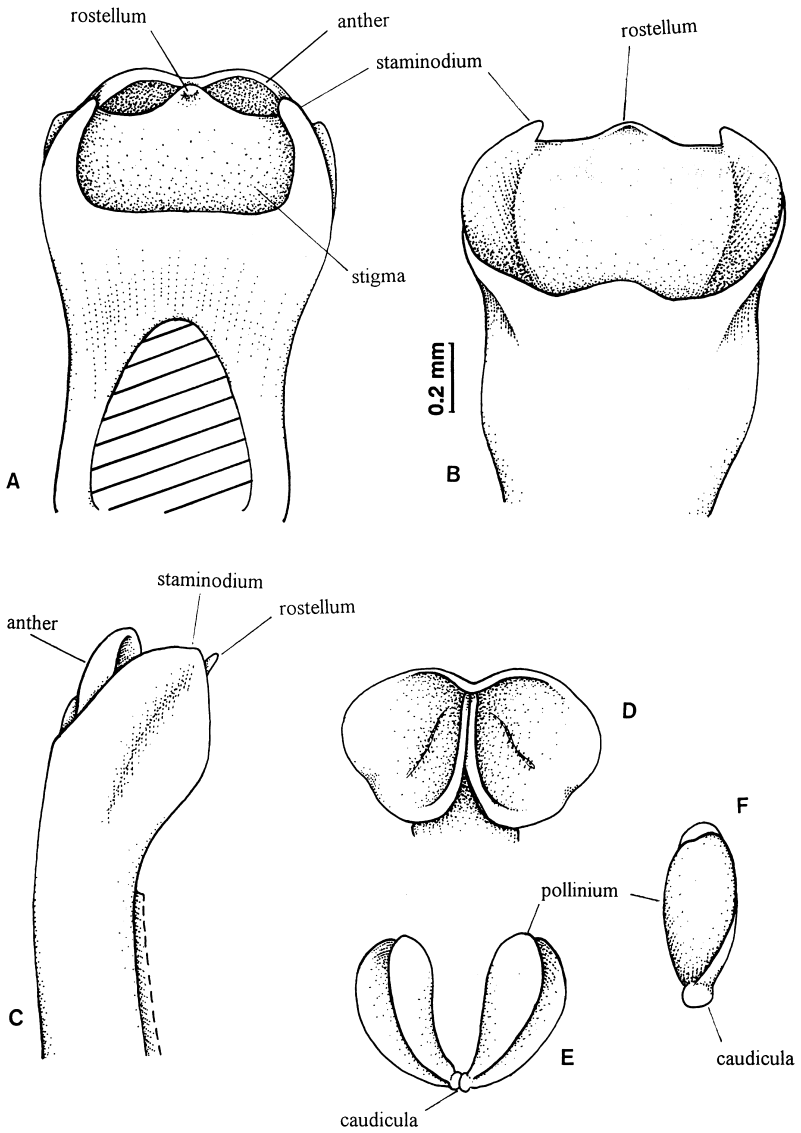

Fig. 1. Generative structures of *Dienia*. — **A**: Gynostemium, dorsal view. — **B**: Gynostemium, front view, without anther. — **C**: Gynostemium, lateral view. — **D**: Anther, dorsal view. — **E**: Two pairs of pollinia with caudicula. — **F**: Single pair of pollinia with caudicula.

Gastroglottis montana Blume, Bijdr.: 397. 1825, *non G. montana* (Rchb.f.) Rchb.f., Xen. Orch. 2 : 96. 1874. (*Pholidota nervosa* Rchb.f.). — *Dienia montana* (Blume) M.A. Clem. & D.L. Jones, Lasianthera 1: 41. 1996. — TYPE: Indonesia. Java, *Blume s.n.* (holotype L!).

Neottia plantaginea D. Don, Prodr. Fl. Nepal.: 27. 1825, *nom. illeg.*, *non N. plantaginea* Raf., Amer. Monthly Mag. & Crit. Rev. 2(3): 206. 1818. (basionym of *Gyrostachys plantaginea* (Raf.) Britton, in Britton & Brown, III Fl. 1: 470. 1896.). — *Spiranthes plantaginea* (D. Don) Spreng., Syst. Veg. 3: 708. 1826. —Type: Nepal. "Hab. in Gosaingsthan Nepalensium", *Wallich s.n.* (holotype not found), *non Spiranthes plantaginea* Lindl., Gen. *et* Sp. Orch. 468. 1830. (Peru), *nec S. plantaginea* Torr., Fl. N. York, 2 : 284. (*Spiranthes latifolia* Torr. *ex* Lindl., Lindl., Gen. *et* Sp. Orch. 468. 1830. N America). — *Gyrostachys plantaginea* (D. Don *ex* Spreng.) Kuntze, Revis. Gen. Pl. 2: 664. 1891.

Dienia fusca Lindl., Gen. Sp. Orchid. Pl.: 22. 1830. — *Microstylis fusca* (Lindl.) Rchb.f. *in* W. G. Walpers, Ann. Bot. Syst. 6: 207. 1861. — *Microstylis congesta* v. *fusca* (Lindl.) Ridl., J. Linn. Soc. 24: 335. 1888. — *Microstylis latifolia* v. *fusca* (Lindl.) J.J. Sm., Fl. Buitenz. 6: 249. 1905. — *Malaxis latifolia* v. *fusca* (Lindl.) Ames, Phil. J. Sci. 6 : 45. 1911. — TYPE: Sri Lanka (Ceylon). *Sine prec. loc.*, in mountains, 1829 *Macrae 7* (holotype K-L!).

Microstylis rheedii sensu Rchb.f., Bonplandia 5: 58. 1957, *non* Lindl., Gen. *et* Sp. Orch. 468. 1830.

Microstylis bernaysii F. Muell., Fragm. Phyt. Austr. 11: 21. 1878. — *Liparis bernaysii* (F. Muell.) F.M. Bailey, Syn. Queensl. Fl.: 508. 1883. — TYPE: Australia. Trinity Bay, on

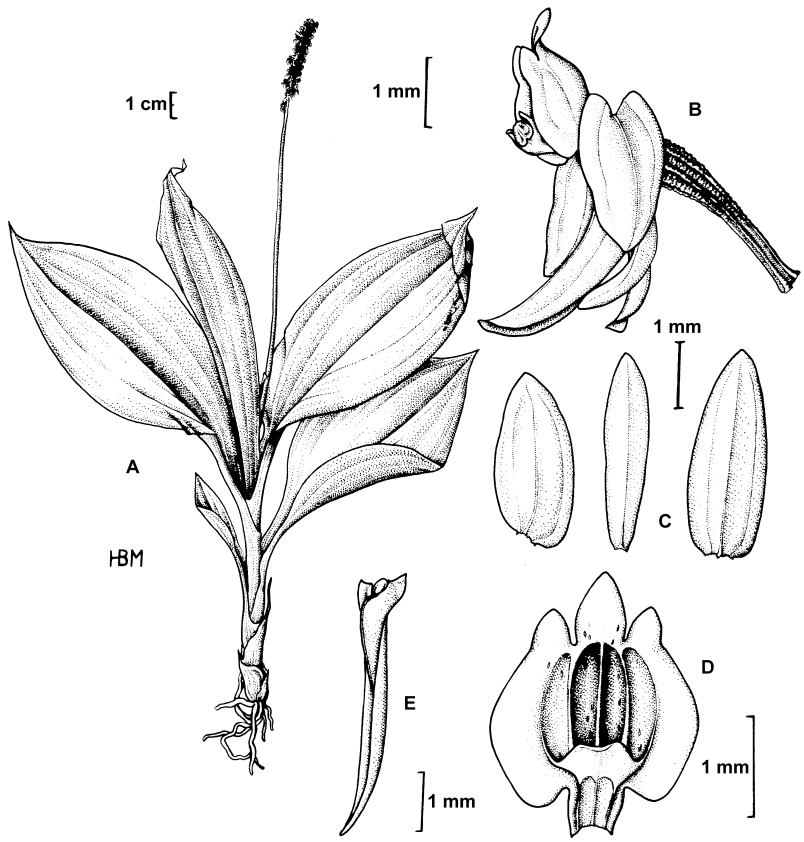

Fig. 2. *Dienia ophrydis* (from the lectotype). — **A**: Habit. — **B**: Flower. — **C**: Tepals. — **D**: Lip. — **E**: Floral bract.

an old trunk top of Bange Back, 1878 *Bailey s.n.* (holotype MEL!, isotype BM-000088119!).

Malaxis curranii Ames, Philipp. J. Sci., C 6: 44. 1911. — *Dienia curranii* (Ames) M.A. Clem. & D.L. Jones, Lasianthera 1: 41. 1996. — TYPE: Philippines. Luzon, Benguet Prov., XIII.1906 *Curran s.n., For. Bur. No. 5105* (holotype AMES!, isotypes K!, US-00093433!).

Microstylis volkensii Schltr., Engl. Jahrb. 1., 56: 458–459. 1921. — *Malaxis volkensii* (Schltr.) Fosberg & Sachet, Micronesica, 20(1–2): 143. 1987. — *Dienia volkensii* (Schltr.) M.A. Clem. & D.L. Jones, Lasianthera 1: 42. 1996. — TYPE: Palau Islands. "Im dichten Mittelhochwald bei Ngatkip, auf Babelthaob, 100 m", III.1914 *Ledermann 14571* (syntype B+!). Caroline Islands. Yap Island, Mashabal Distr., "in einer feuchten Senkung mit schattigem Geholzbusch", *Volkens 174* (syntype B+!).

Microstylis carnosula Rolfe *ex* Downie, Bull. Misc. Inform. Kew 1925: 368. 1925. — *Malaxis carnosula* (Rolfe *ex* Downie) Seidenf. & Smitinand, Orch. Thail. (Prelim. List): 146. 1959. — *Glossochilopsis carnosula* (Rolfe *ex* Downie) Szlach. & Marg., Polish Bot. J. 46: 114. 2001. — TYPE: Thailand. Doi Suthep, 900 m, *Kerr 278* (holotype K!, isotype K!).

Liparis krempfii Gagnep., Bull. Soc. Bot. France 76: 514. 1929. — TYPE: Vietnam. Ton Ha Sui, *Krempf 1570* (holotype P!).

Liparis turfosa Gagnep., Bull. Soc. Bot. France 76: 515. 1929. — TYPE: Vietnam. Massif de la Mere et de l'Enfant, Nhatrang, *Poilane 6822* (holotype P!).

Anaphora liparioides Gagnep., Bull. Mus. Natl. Hist. Nat., II, 4: 592. 1932, *non Microstylis liparidoides* Schltr., Fed. Rep. Beih. 4: 62. 1919, *nec M. liparidoides* Finet, Bull. Soc. Bot. France 55: 333. 1908. — *Malaxis vietnamensis* T.B. Nguyen & D.H. Duong *in* T.B. Nguyen (ed.), Fl. Taynguyen. Enum.: 202. 1984, *nom. nov.* — TYPE: Vietnam. Tourane, *Poilane 7941* (holotype P!).

Microstylis kizanensis Masam., Ann. Rep. Kaihoku Bot. Garden 3: 75. 1933. — *Malaxis kizanensis* (Masam.) Hatsusima, Fl. Ryukyus 1971: 863. 1971, S.Y. Hu, Quart. J. Taiwan Mus. 27: 433. 1974, Bull. Exp. Forest Nation. Taiwan Univ. 114: 154. 1974. — TYPE: not found.

Microstylis ishigakensis Ohwi, J. Jap. Bot. 13: 439. 1937. — TYPE: Japan. Ryukyu, Ishigaki, *Koidzumi s.n.* (holotype KYO!).

Microstylis dalatensis Guillaumin, Bull. Mus. Natl. Hist. Nat., II, 27, 5: 397. 1955. — TYPE: Vietnam. Dalat, *CRST 38* (holotype P!).

Malaxis parvissima S.Y. Hu & Barretto, Chung Chi J. 13(2): 22. 1976. — TYPE: Hong Kong. New Territories Tai Mo Shan, over 900 m, *S.Y. Hu 12453* (holotype K!, isotype CUH!).

Malaxis latifolia var. *nana* S.S. Ying, Mem. Coll. Agric.

Natl. Taiwan Univ. 25: 101. 1985. — TYPE: not found.

Malaxis shuicae S.S. Ying, J. Jap. Bot. 62: 70. 1987. — TYPE: not found.

Malaxis plicata Roxb., Hort. Beng. 68. 1814, *nom. nud.*, Fl. Ind. ed. 1832, 3: 456. 1832. — TYPE: Cult. *ex* Indonesia, Sumatra, *sine prec. loc.*, *Roxburgh s.n.* (not found).

Microstylis trilobulata Kurz, Rep. Veg. Andaman Isl., App. B: 19. 1870, *nom. nud.* — Original collection: India. Andaman Islands, *Berkeley s.n.* (K!).

Plants variable in size, (15)20–45(80) cm tall, erect, in clusters. Pseudobulb 4–10(14) cm long, (0.2)0.6–1.4(2) cm in diam. Leaves (3)4–5(6); leaf petiole 0.3–1.8 cm long, 0.3–0.7 cm wide when spread; leaf sheath 0.5–1.6 cm, 0.2–2 cm in diam.; leaf blade (3)10–23(30) cm long, (1.8)3.5–6.8(10) cm wide, ovate to oblong ovate, to nearly lanceolate; green or particularly leaf petiole and sheaths with red, purple or violet tint, paler below. Inflorescence (10)20–30(55) cm long, raceme (5)10–16(25) cm long, 20–6(80)-flowered, dense to very dense. Ovary with pedicel 1.8–3.2 mm long. Sterile bract 5.5–8 mm long, 0.8–1.8 mm wide. Floral bracts 3–6 mm long, 0.5–1.2 mm wide. Flowers 3.5–6 mm long, 3.2–4.8 mm wide, always facing down, green, yellow, red, purple to violet or any combination of these colours, always turning darker with age. Tepals curving inwards. Dorsal sepal 2.8–3.2 mm long, 1–1.2 mm wide, oblong. Lateral sepals 2.5–3 mm long, 1–1.5 mm wide, ovate. Petals 2.8–3.5 mm long, 0.5–0.8 mm wide, narrowly oblanceolate to nearly linear, about acute at apex. Lip 2–3 mm long, 1.2–2 mm wide, ovate in outline, widest at about lip base; cavity (embracing whole of lip lamina surface) large and deep, 0.7–1.1 mm long, 0.7–0.8 mm wide, external elements of cavity (semiovate to lunate) embracing parts of lateral lobes, central element 0.4–0.6 mm wide, 0.3–0.45 mm deep, ovate; mid-lobe 0.5–0.9 mm long, 0.3–0.5 mm wide near base, oblong, entire, subacute to obtuse at apex; each lateral lobe distally with small, oblong**,** apically entire sublobe (0.3–0.6 mm long, 0.3–0.5 mm wide near base), auricles of lateral lobes strongly abbreviated, rounded; basal callus 0.3–0.45 mm high, 0.7–1 mm wide near its base; lip base well developed 0.6–0.8 mm long, 0.5–0.7 mm wide. Gynostemium 1.3–1.5 mm long, green to yellow. Anther 0.4–0.5 mm long, 0.5–0.6 mm wide, ovate to nearly cordate.

DISTRIBUTION: Sri Lanka, India (Deccan to Himalaya), Nepal, China, Japan (Ryukyu Islands), Indochina, Malaysia, Philippines, Greater and Lesser Sunda Islands, N Australia to SW Pacific Islands. The plants favor lower elevations, but can be found from sea level up to 2000 m.

ECOLOGY: Terrestrial or occasionally epiphytic; on sand, clay, or humus, sometimes on rocks, often in leaf-litter; between grasses, mosses etc.; preferring rather open habitats: grassy road sides, banks of forests, but occurring also in more wet and shaded places, in primary to secondary, lowlands to hills, subtropical to tropical forests, also in bamboo forests.

Dienia ophrydis is one of the most widespread and common species within the whole Malaxidinae. The plants, especially the dark purple-violet forms are often cultivated. Field data concerning them are rather rich. The species has been described at both species and variety level nearly 50 times, over 20 of the the descriptions being are heterotypical. The morphology and anatomy of the vegetative parts and floral elements, especially the form of lip and gynostemium, are consistent. The differences between the supposedly separate taxa usually regard the size of the plants or their parts, or color of leaves, flowers, etc. The plants exhibit a wide range of variation in measurements and colour, particularly of the leaves and flowers.

Dienia ophrydis can be very easy recognized on the basis of the very characteristic flowers. They are always facing down; with tepals curving inwards; lip with a typical large and deep lamina cavity; mid-lobe entire, relatively small, oblong; lateral lobes with small oblong, entire lobes at distal margins, and abbreviated auricles; ovary and fruits with very distinct wavy ribs and rippling, nearly crenulate surfaces between them.

Dienia seidenfadeniana Szlach., Marg. & Rutk. (Fig. 3)

Adansonia, III, 21: 221. 1999. — TYPE: Indonesia. Northern Sumatra, E coast, Karo-land, Kampoeng, 2.VII.1918 *Bartlett & la Rue 254* (holotype L-920336294!). — PARATYPE: Indonesia. Irian Jaya, Vogelkop Pennisula, Alfat River Valley,

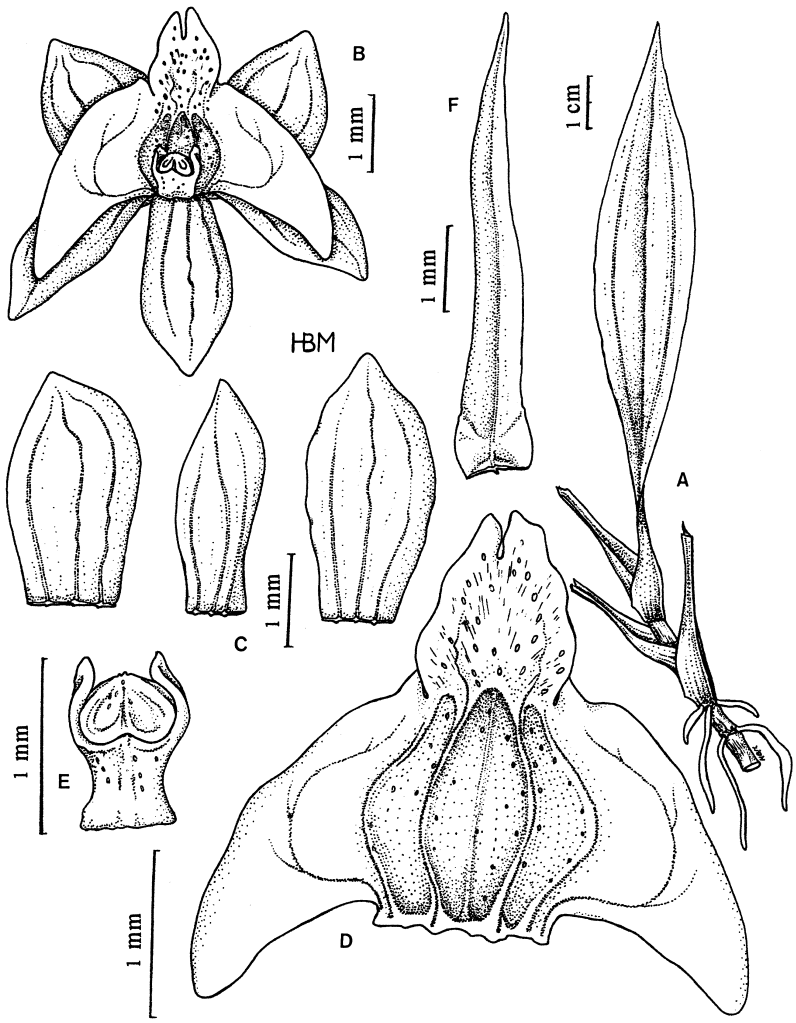

Fig. 3. *Dienia seidenfadeniana* (from the holotype). — **A**: Plant. — **B**: Flower. — **C**: Tepals. — **D**: Lip. — **E**: Gynostemium. — **F**: Floral bract.

path from Sururem to Son Village, *van Royen & Sleumer 7508* (L!).

Plants 17–28 cm tall, erect; in clusters, young shoots sprouting from top of raising rhizome. Pseudobulbs 4.5–10 cm long, 0.16–0.3 cm in diam., slender and elongate, fusiform. Leaves (2)9–14; leaf petiole 0.7–2 cm long, 0.2–0.6 cm wide when spread, purple-tinged; leaf sheath 0.6–1.5 cm, 0.2–0.4 cm in diam., dark-purple; leaf blade 5.3–10.2 cm long, 1.8–2.6 cm wide, oblique, oblong ovate to nearly lanceolate, attenuate, acuminate at apex; yellowish green with purple veins on undersurface, blade paler beneath. Inflorescence 12–17.3 cm long, raceme 3.8–5.6 cm long, 0.6–1.8 mm in diam., 20–60-flowered, dense; peduncle 8–11 cm long, 1.5–2.2 mm in diam., dark-purple. Ovary with pedicel 4–7 mm long. Sterile bract 5–7 mm long, 1.6–3 mm wide, broadly triangular at base. Floral bracts 3–5 mm long, 0.6–1.4 mm wide. Flowers 5.5–6.5 mm long, 4.2–4.5 mm wide, older facing down, turning darker with age. Tepals slightly spreading to curved inwards, purple with green edges. Dorsal sepal 2–3 mm long, 1–1.6 mm wide, oblong to oblong-obovate. Lateral sepals 2–2.6 mm long, 1.3–1.8 mm wide, ovate to oblong-obovate. Petals 2.2–2.5 mm long, 0.8–1.1 mm wide, oblong to oblanceolate, acute at apex. Lip 2.2–3.4 mm long, 3.2–4 mm wide, broadly ovate, widest just above lip base, green; cavity (embracing nearly the whole lamina surface)

large and deep, 1–1.2 mm long, 1.3–1.6 mm wide, external elements of cavity slightly shallower, at each side semiovate to lunate in outline, central element 0.6–0.7 mm wide, 0.35–0.45 mm deep, ovate to broadly ovate; mid-lobe 0.8–1.4 mm long, 1–1.2 mm wide near base, ovate, 2-lobed at top; lateral lobes with well-developed, oblong, entire sublobes at distal margins, (0.2–0.3 mm long, 0.3–0.35 mm wide near base), and distinct auricles (ca. 1 mm long, 0.7–0.9 mm wide near base), ca. triangular, gently falcate, obtuse, spread, reaching distinctly below lip base; basal callus 0.3–0.35 mm high, 0.8–1 mm wide near its base; lip base well-developed, 0.3–0.4 mm long, 0.6–0.8 mm wide. Gynostemium ca. 1 mm long, green to yellow. Anther 0.5–0.6 mm long, 0.7–0.8 mm wide, nearly cordate.

DISTRIBUTION: Indonesia (Sumatra, Irian Jaya). Alt. 500–720 m.

ECOLOGY: Terrestrial; on humus, in leaf-litter; in oak forest and deep jungle; flowering in July (Sumatra) and October (Irian Jaya).

Dienia seidenfadeniana is distinguished by the young shoots appearing from top of an ascending rhizome; pseudobulbs slender and elongated; leaves oblong to oblong-ovate; older flowers often facing down; tepals slightly spreading to curved inwards; lip with a typical large and deep lamina cavity; mid-lobe large, ovate, 2-lobed at top; lateral lobes with small oblong lobes entire at distal margins, and with auricles nearly lunate, falcate, reaching distinctly below the lip base.

Acknowledgments

We are grateful to Dr. P. Cuccini and Dr. Chiara Nepi, the Curators of FI and the Curators of AMES, B, BM, BO, C, C-GS, G, K, K-L, L, LINN, P, SING, US, W and WU for loaning of herbarium specimens and/or their hospitality during the personal visits. Special thanks for Mrs. e. M. G. Kortylewska-Margońska and Mr. e. M. Margoński for help during the first author researches. This study was financed by KBN (Polish Committee for Scientific Research) grant No. 3P04C-082-24.

References

Blume, C. L. 1825: Orchideen. — In: *Bijdragen tot de Flora van Nederlandsch India*: 285–434. Ter Lands Drukkerij, Batavia.

Clements, M. A. & Jones, D. L. 1996: *Crepidium myosotis*, a new species of Orchidaceae from Papua New Guinea. — *Lasianthera* 1: 32–45.

Greuter, W., McNeill, J., Barrie, F. R., Burdet, H. M., Demoulin, V., Filgueiras, T. S., Nicolson, D. H., Silva, P. C., Skog, J., Trehane, P., Turland, N. J. & Hawksworth, D. L. 2000: International code of botanical nomenclature (Saint Louis Code) adopté par le Sixième Congrès Botanique International, St. Louis, Missouri, juillet-août 1999. — *Regnum Vegetabile* 138(18): 1–474.

Lindley, J. 1824: t. 825. — In: Edward, S. T. (ed.), *Consisting of coloured figures of exotic plants cultivated in British gardens; with their history and mode of treatment* 10. Edward's Botanical Register, London.

Lindley, J. 1830: *The genera and species of orchidaceous plants*: 22–23. Ridgways, London.

Margońska, H. B. 2006: Contribution to the taxonomic revision of the genus *Crepidium* (Orchidaceae-Malaxidinae): the new subsection *Maximowiczianae* (section Hololobus). — *Edinburgh J. Bot.* 62: 165–179.

Seidenfaden, G. 1978: Orchid genera in Thailand 7. — *Dansk Bot. Arkiv.* 33: 1–95.

Seidenfaden, G. 1997: *Contributions to the orchid genera of Thailand* 13. — Olsen & Olsen, Fredensborg.

Smith, J. J. 1905: Die Orchideen von Java. — *Flora Buitenzorg* 6: 1–672.

Szlachetko, D. L. 1995: Systema Orchidalium. — *Fragm. Flor. Geobot.* Suppl. 3: 1–152.

Szlachetko, D. L. & Margońska, H. B. 2006: Redefinition of the genera *Malaxis* Sol. *ex* Sw. and *Microstylis* (Nutt.) Eaton (Orchidaceae, Epidendroideae). — *Acta Soc. Bot. Pol.* 75: 229–231.

Szlachetko, D. L. & Margońska, H. B. 2002: Gynostemia Orchidalium II. Orchidaceae (Epidendroideae). — *Acta Bot. Fennica* 173: 1–275.

Szlachetko, D. L., Margońska, H. B. & Rutkowski, P. 1999: *Dienia seidenfadeniana*, a new orchid species from Australasia. — *Adansonia*, ser. 3., 21: 221–223.

Tang, T. & Wang, F. T. 1951: Contribution to the knowledge of Eastern Asian orchids 2. — *Act. Phytotax. Peking* 1(1): 24–102.